Claims

1. A method for the combustion of fuel in a combustion chamber (12), in which
- fuel and combustion air are mixed, avoiding self-ignition, before entry into the combustion chamber (12),
- a first part (36) of the mixture (34) is introduced into the combustion chamber (12) in such a way that it circulates in the combustion chamber (12),
- further fuel is added to the circulation flow (46) of the first part (36) of the mixture (34) until heating up to ignition conditions is guaranteed, and
- at least one second part (38) of the mixture (34) is introduced into the combustion chamber (12) in such a way that it mixes with a hot combustion gas (50) which flows away from the circulation flow (46), heats up and combusts until its exit from the combustion chamber (12).

2. The method as claimed in claim 1, characterized in that the fuel and the combustion air are mixed before entry into the combustion chamber (12), in such a way that the ratio of combustion air to fuel is higher than the average air/fuel ratio of the combustion in the combustion chamber (12).

3. The method as claimed in claim 1 or 2, characterized in that the first and/or second part (36, 38) of the mixture (34) of fuel and combustion air, there being at least one such second part, is introduced via a body (22) which is arranged centrally in the combustion chamber (12).

4. The method as claimed in claim 3,

characterized in that fuel is supplied in the form of a combustion gas, and liquid fuel is also supplied via the centrally arranged body (22).

5. The method as claimed in one of the claims 1 to 4, characterized in that the circulation flow (46) of the first part (36) of the mixture (34) of fuel and combustion air is formed in a peripheral region (40) of the combustion chamber (12).

6. The method as claimed in one of the claims 1 to 5, characterized in that the combustion chamber (12) is essentially cylindrical or annular in shape and the first part (36) of the mixture (34) of fuel and combustion air is introduced into the combustion chamber (12) in an essentially radial manner.

7. The method as claimed in one of the claims 1 to 6, characterized in that the combustion chamber (12) is essentially cylindrical or annular in shape and the further fuel (48) is introduced into the combustion chamber (12) in an essentially axial manner.

8. The method as claimed in one of the claims 1 to 7, characterized in that the combustion chamber (12) is essentially cylindrical in shape and the second part (38) of the mixture (34) of fuel and combustion air, there being at least one such second part, is introduced into the combustion chamber (12) in an essentially radial manner.

9. The method as claimed in one of the claims 1 to 8, characterized in that the first and the second part (36, 38) of the mixture (34) of fuel and combustion air, there

being at least one such second part, are discharged into the combustion chamber (12) as a common stream which is divided within the combustion chamber (12).

10. The method as claimed in one of the claims 1 to 9, characterized in that the first and/or the second part (36, 38) of the mixture (34) of fuel and combustion air, there being at least one such second part, are discharged into the circulation flow (46) and the combustion chamber (12) via at least one specially adapted nozzle (28, 28').

11. The method as claimed in one of the claims 1 to 10, characterized in that the circulation flow (46) is configured such that, of the total gas mass which is supplied during one time unit, approximately 5% to 25% and particularly between approximately 10% and 20% circulates in said circulation flow per time unit.

12. A device (10) for the combustion of fuel in a combustion chamber (12), in particular for carrying out the method as claimed in one of the claims 1 to 11, comprising
- a mixing entity (22) for mixing fuel and combustion air, avoiding self-ignition, before entry into the combustion chamber (12),
- a first mixture discharge entity for introducing a first part (36) of the mixture (34) into the combustion chamber (12) in such a way that the first part (36) of the mixture (34) circulates in the combustion chamber (12),
- a fuel discharge entity (48) for supplying further fuel into the circulation flow (46) of the first part (36) of the mixture (34) until ignition conditions are present, and
- at least one second mixture discharge entity for introducing at least one second part (38) of the mixture (34) into the

combustion chamber (12) in such a way that said second part (38), of which there is at least one, of the mixture (34) mixes with a hot combustion gas (50) which flows away from the circulation flow (46), heats up and combusts until its exit from the combustion chamber (12).

13. The device as claimed in claim 12, characterized in that the first and/or second mixture discharge entity, there being at least one such second mixture discharge entity, is configured as a body (22) which is arranged centrally in the combustion chamber (12).

14. The device as claimed in claim 13, characterized in that the first and/or second mixture discharge entity, there being at least one such second mixture discharge entity, is designed for discharging gaseous fuel, and at least one entity for discharging liquid fuel is additionally provided in the centrally arranged body (22).

15. The device as claimed in one of the claims 12 to 14, characterized in that the first mixture discharge entity and the combustion chamber (12) are configured such that the circulation flow (46) of the first part (36) of the mixture (34) of fuel and combustion air occurs in a peripheral region (40) of the combustion chamber (12).

16. The device as claimed in one of the claims 12 to 15, characterized in that the combustion chamber (12) is essentially cylindrical or annular in shape and the first mixture discharge entity is configured such that it introduces the first part (36) of the mixture (34) of fuel and combustion air into the combustion chamber (12) in an essentially radial manner.

17. The device as claimed in one of the claims 12 to 16, characterized in that the combustion chamber (12) is essentially cylindrical or annular in shape and the fuel discharge entity (48) is configured such that it introduces the further fuel into the combustion chamber (12) in an essentially axial manner.

18. The device as claimed in one of the claims 12 to 17, characterized in that the combustion chamber (12) is essentially cylindrical or annular in shape and the second mixture discharge entity, there being at least one such second mixture discharge entity, is configured such that it introduces the second part (38) of the mixture (34) of fuel and combustion air, there being at least one such second part, into the combustion chamber (12) in an essentially radial manner.

19. The device as claimed in one of the claims 12 to 18, characterized in that the first and the second mixture discharge entity, there being at least one such second mixture discharge entity, are configured such that they discharge the first and the second part (36, 38) of the mixture (34) of fuel and combustion air, there being at least one such second part, into the combustion chamber (12) as a common stream.

20. The device as claimed in one of the claims 12 to 19, characterized in that the first and/or a second mixture discharge entity, there being at least one such second mixture discharge entity, feature at least one specially adapted nozzle (28, 28') for discharging fuel into the circulation flow (46) and the combustion chamber (12).

21. The device as claimed in one of the claims 12 to 20, characterized in that the combustion chamber (12) and the first and the second mixture discharge entity, there being at least one such second mixture discharge entity, are configured such that, of the total gas mass which is supplied during one time unit, approximately 5% to 25% and particularly between approximately 10% and 20% circulates in the circulation flow (46) per time unit.